

*innominate and subclavian* one, in 1 case ending in recovery; for *aneurism of the aortic arch* in 6 cases, with 3 recoveries, 1 improvement and 2 (33.3 per cent) deaths; for *aneurism of the aortic arch and innominate artery* in 7 cases, with 2 recoveries, 3 improvements and 2 (28.6 per cent) deaths. On the whole, out of 34 cases only 9 (26.5 per cent) died. On addition of such cases where the third division and carotid were tied at two sittings, as well as those of ligature of the fourth division and carotid, we obtain 46 cases, with 30 recoveries and 16 (34.7 per cent) deaths.

D. *General corollaries.* 1. In pre-antiseptic times, ligature of the third and fourth divisions gave an approximately identical percentage of deaths (about 44 per cent). 2. Ligature of the second portion of the vessel in that period was seemingly followed by a lesser mortality (22.2 per cent). However, the total number of the cases is too small for justifying any positive conclusions. 3. In our antiseptic days, ligature of the third division gives a comparatively low mortality, amounting to from 25 to 30 per cent. 4. A simultaneous (at one sitting) ligature of the third division and common carotid, resorted to for aneurism of the innominate artery and aortic arch, gives nowadays excellent results, the mortality amounting only to 26.5 per cent. Hence the operation represents one of the most valuable acquisitions of modern surgery. 5. Generally, ligature of the subclavian as a curative means for aneurisms gives a relatively low percentage of deaths (about 33). 6. The worst results are obtained from the ligature in cases of hæmorrhage (of any kind), the mortality surpassing 50 per cent.—*Transactions of the Third General Meeting of Russian Medical Men at St. Petersburg, 1889, No. 10.*

VALERIUS IDELSON (Berne.)

**IV. Wounds of the Internal Mammary Artery.** By WILHELM KOCH. Wounds of this region are not often seen in civil practice, but occur in military surgery as a result of sabre cuts, and cuts made in sabre position of "seconde" and "quatre."

A well directed "seconde" cut falls on the right side of the face, neck and shoulder, while a "quatre" cut falls on root of neck on left

side and on anterior and left side of chest. It is not uncommon for a "seconde" cut to strike on the outer third of the clavicle, and to penetrate in the deltoideo-pectoral groove, severing all the great vessels in this region.

In a "quatre" cut the direction of the wound is from inner portion of the left clavicle diagonally downward, severing the insertion of the 3d and 4th costal cartilages, opening the left pleura, severing the internal mammary artery and its accompanying veins, and sometimes wounding the lung.

The author has collected a large number of observations on wounds of the internal mammary artery. Wounds of the artery in the vicinity of the sternal end of the clavicle are not discussed here, since they are usually attended with injury to the larger vascular trunks (subclavian artery and vein, carotid and innominate arteries), and are therefore of secondary importance.

The sternal portion of the internal mammary artery extends from the first costal cartilage to the sixth intercostal space, where the vessel divides into two branches, and is accompanied by two veins. Of some practical importance is the distance of the artery from the margin of the sternum, which the author finds to vary from 3 to 22 mm.

The anatomical relations of this portion of the artery show that wounds of this vessel without simultaneous injury to the pleura, lungs or heart, are only exceptionally possible. Owing to the intimate relation of the vessel to these structures, bleeding from the vessel is of less importance than the coexisting severe laceration of the neighboring parts.

Only four cases are found in literature in which wound of the pleura was absent. The pleural wounds are often so extensive as to lay open the anterior mediastinum.

In 38 cases of wounds of the internal mammary artery, the pericardium alone was opened in 3, and the heart wounded in 7 (four being perforating and three non-perforating wounds). The divided and bleeding ends of the artery were directly visible, without further exposure in two cases, but usually the divided vessel retracts behind the costal cartilages, or into the intercostal spaces.

Bleeding from the external wound is inconsiderable, unless the patient stirs or coughs when dark blood mixed with air pours from the thoracic cavity. Gradually the signs of hæmato-thorax develop, except in the rare cases where the pleura is not wounded. If the blood escapes externally in a large pulsating stream from the 3d, 4th or 5th intercostal space near the sternum, if the thoracic cavity is rapidly filled, and marked syncope and acute anæmia supervene, it is certain that the heart is the main source of the hæmorrhage. Hæmorrhage from the 3d, 4th or 5th intercostal space, if due to wound of the internal mammary artery is usually internal; the blood escaping into the pleural sac and pericardium.

The first symptoms of wounds of the internal mammary and adjacent parts are external and internal hæmorrhage, hæmopneumothorax, (more rarely hæmopericardium), and impairment of respiration and cardiac action.

Of the 38 cases reported, only 3 succumbed from acute hæmorrhage. In other cases, when the patient lived for a number of hours, dyspnœa, commencing sepsis and acute pulmonary œdema contributed to the fatal issue. Cases are recorded in which patient lived for some time, and the bleeding from the mammary was spontaneously arrested.

Surgical means were usually of little value in causing an arrest of the hæmorrhage; tamponing was successful in one case, and heroic venesection in two others.

Of the 38 cases, 9 died within 24 hours, 1 in 48 hours of hæmorrhage and sepsis. Of the remaining, one died of peritonitis, one of mediastinitis, three of mediastinitis and pericarditis, thirteen of pleuritis, and nine recovered.

The pleurisy was treated by operative means in only three cases and then after incorrect principles. None of the patients living for some time escaped secondary hæmorrhage, and this usually contributed to the fatal termination.

The deductions drawn by the author from an analysis of the 38 reported cases, are, that in only four or at the most five cases, were the complications of an absolutely fatal character, with the present means at our disposal. An attempt should have been made in at least 33

cases to ligate the artery and treat the hæmatothorax, the pleuritis, hæmopericardium, mediastinitis and fracture of the sternum. It is to this neglect that the high mortality is due.

Of course surgical interference is futile in cases in which the heart and large vessels are wounded. In other cases, the treatment should be based upon the rapidity with which the hæmopneumothorax is developed, and the condition of the wound. If hæmothorax occurs early, and the wound is small, it would seem hazardous to enlarge the opening and search for the bleeding vessels. This procedure would probably increase the pleural wound, and the withdrawal of the blood from the thorax would remove the compressing force on the lung, which is the best provisional means of arresting pulmonary hæmorrhage of this kind.

It is better, in these cases, to make an incision in the intercostal space above and below the wound and to secure the bleeding vessel in this situation. The hæmatothorax should not be removed until it has become stationary, and may then be punctured or withdrawn by incision of the pleuræ, after the resection of a rib. If, on the other hand, the wound is large and permits of inspection of the thoracic cavity, the artery should be at once ligated in the wound. If the hæmothorax is due to a wound of the lung, and is not checked by ligation of the mammary artery, the outer wound may be closed with an impermeable compress, so as to increase the intrathoracic pressure. If, however, the hæmothorax comes chiefly from the mammary, and the pulmonary wound is unconsiderable, resection of the rib should be at once performed and the exudate removed, the incision being made at the most dependant part.

When the wound of the mammary is so situated in the 2d or 3d intercostal space, and is complicated by a not rapidly fatal opening in the pericardium, the vessel should be ligated and the wound closed antiseptically on the outside, and the hæmopericardium be treated by surgical means.

There remains one class of cases, in which besides division of the internal mammary, the heart is wounded in a not immediately fatal manner. In these cases, if blood is seen to issue from the peri-

cardium, the opening should be closed the mammary artery ligated and the pleural wound sutured.

As regards technique of ligation of the internal mammary the following may be said. The vessel is frequently wounded behind the costal cartilage and to bring it into view, a corresponding piece of the cartilage must be excised, and the artery ligated in the adjacent intercostal space. If the wound of the vessel has occurred in one of the intercostal spaces an incision should be made down to the subpleural tissue, then in case the vessel does not appear, two flaps should be formed from the cartilage and soft parts, immediately above and below the wound, and when these flaps are turned back the artery will be visible either on the under surface of the cartilage or in the subpleural tissue, and after ligation of the vessel the cartilages are returned to their normal position.—*Archiv. f. Klinische Chirurgie*, Bd. 37, Hft. II.

F. C. HUSSON (New York).

## HEAD AND NECK.

**I. Experimental Contributions to Cerebral Surgery.** By DR. IVAN K. SPIJARNYI (Moscow, Russia). The author has carried out 56 experiments on dogs and rabbits, in order (1) to determine the amount of vital and functional danger from brain-wounds, and (2) to study the process of healing of such wounds. The conclusions drawn by him from his researches may be condensed as follows: 1. Excision of wedges from the brain, varying in size from a pea to a walnut, is not associated with any immediate danger to the animal's life. Neither does it by itself give rise to any pronounced functional changes. The lesion, however, is frequently followed by consecutive hæmorrhage and epileptoid fits. The former complication may be prevented by carefully controlling bleeding during the operation. 2. Similarly, introduction of foreign bodies into the brain substance does not necessarily place the patient in vital danger, and does not bring about any immediate marked functional disturbances, but it is followed by secondary epileptoid symptoms. 3. Both incised and punctured wounds of the cerebral cortex and white matter are almost harmless in